

6 Alaska AK STAR

GRADE 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving For
Comprehensive Assessment Programs



6 PRINTED
TESTS



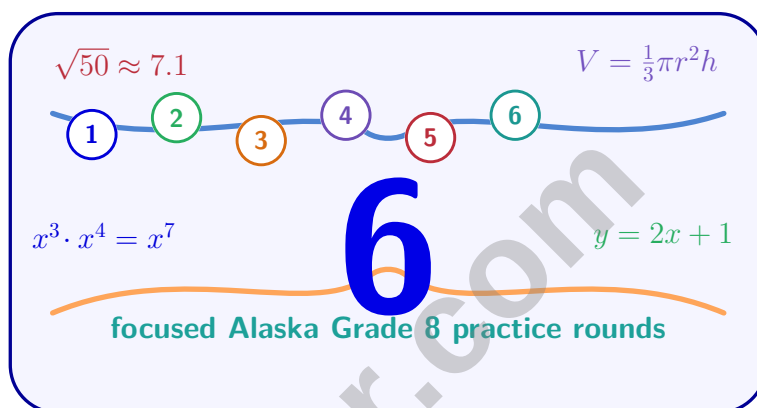
2 ONLINE
TESTS



Use these two additional online practice tests for extra review after the printed tests in this book.

6 Alaska AK STAR Grade 8 Math Practice Tests

Focused Grade 8 Review with Keys, Explanations, and State-Test Practice



Six complete 40-question Grade 8 AK STAR practice rounds with real numbers, exponents, scientific notation, equations, functions, transformations, geometry, data analysis, probability, answer keys, and clear explanations for every item.

Jay Daie and Reza Nazari



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Welcome, Alaska Grade 8 Problem Solver!

Six focused rounds for sharper AK STAR math thinking

This book gives you six full Grade 8 AK STAR math practice tests. Each round is built to help you recognize structure, reason with real numbers and exponents, analyze linear relationships, connect equations with graphs, and explain your thinking with care.

Your Alaska Practice Promise

I will read every question carefully, choose a strategy that fits, write enough work to prove my answer, and use corrections as training for the next test.

Read

Model

Verify

How to Use This Book

A six-session plan for confident Grade 8 review

1. **Warm up with the review pages.** Notice the big ideas before starting the tests.
2. **Complete one test at a time.** Treat each 40-question round like a real practice session.
3. **Show your reasoning.** Jot an exponent rule, equation, graph, transformation, diagram, or quick estimate when it helps.
4. **Correct actively.** Rework missed items before reading the explanation.
5. **Choose the next target.** After each test, name one skill and one habit to improve.

Alaska review rhythm: Work a test, score it, study your misses, then come back ready for the next round with one clear goal.



What Is Inside?

Six AK STAR tests, 240 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 4–6	Functions, systems, transformations, geometry, data analysis, and multi-step problem solving.
Answer Pages	Compact keys and explanations that show why each answer works.

The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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& answers

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1) Which of the following equals 3.8×10^2 ?

☐ A. 38

☐ C. 3,800

☐ B. 38,000

☐ D. 380

Decimal Classification	
Terminating	Repeating
0.25 0.5	0.33 0.142857

2)

Both categories shown contain rational numbers. Which is irrational?

☐ A. 0.1234567 (terminating)

☐ C. $\frac{22}{7}$

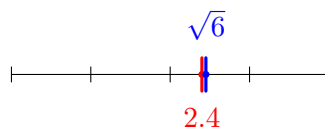
☐ B. 0.999... (repeating 9's)

☐ D. 0.3030030003... (non-repeating)

3) For $y = 2.5x + 5$, what is the y -intercept?

Perfect Squares: $2^2 = 4$, $3^2 = 9$

Compare to $\sqrt{6}$ and 2.4



4)

Is $\sqrt{6}$ greater than 2.4 or less than 2.4?

☐ A. Cannot compare

☐ C. Equal to

☐ B. Less than

☐ D. Greater than



5) Which of these is rational?

☐ A. $\sqrt{17}$

☐ B. $\sqrt{19}$

☐ C. $\sqrt{21}$

☐ D. $\sqrt{36}$

6) Sarah invests \$2,000 at 5% simple interest for 3 years. At the end of 3 years, she decides whether to withdraw all her money or let it grow another 3 years at the same rate. Which statement correctly predicts the impact of waiting another 3 years?

☐ A. No additional interest accrues after 3 years☐ B. She will earn another \$600 in interest (total after 6 years: \$2,900)☐ C. Interest compounds, so she earns more than \$300☐ D. She will earn another \$300 in interest (total after 6 years: \$2,600)

7) Simplify $5^0 \cdot n^7 \cdot n^{-7}$.

☐ A. n^{14}

☐ B. n

☐ C. $5n$

☐ D. 1

8) What is $\sqrt{196}$?

☐ A. 12

☐ B. 13

☐ C. 14

☐ D. 15

9) $(8 \times 10^4) \times (9 \times 10^5) = ?$

☐ A. 72×10^7

☐ B. 0.72×10^{10}

☐ C. 17×10^9

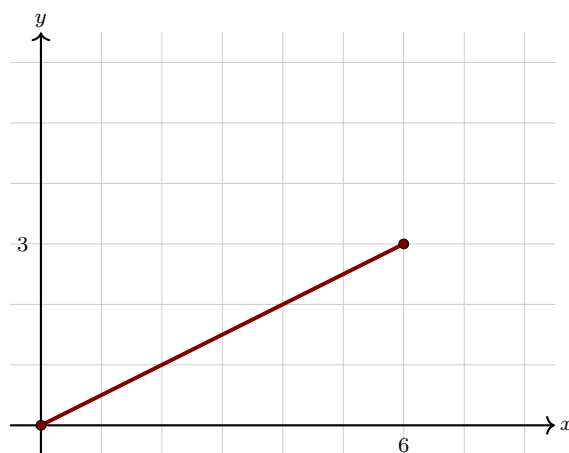
☐ D. 7.2×10^{10}



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10)



What is the unit rate shown in the graph?

- ☐ A. 3 units of y per unit of x
- ☐ B. 2 units of y per unit of x
- ☐ C. $\frac{1}{2}$ unit of y per unit of x
- ☐ D. 6 units of y per unit of x
- 11) Line A passes through $(0,0)$ and $(3,6)$. Line B passes through $(0,1)$ and $(2,7)$. Which line increases faster?
- ☐ A. Line A
- ☐ B. Line B
- ☐ C. Both increase equally.
- ☐ D. Cannot determine.
- 12) A car travels at a constant speed of 60 mph. After starting, the distance d (in miles) traveled after h hours is given by which equation?
- ☐ A. $d = 60h$
- ☐ B. $d = 60h + 1$
- ☐ C. $d = h + 60$
- ☐ D. $d = \frac{60}{h}$

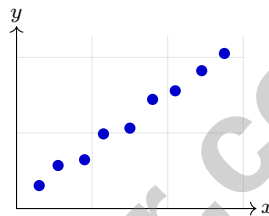


- 1) A student finds the hypotenuse of a 7-24-? right triangle. They calculate $c^2 = 7 + 24 = 31$. Is this method correct?

- ☐ A. Yes; $c = \sqrt{31}$ units ☐ C. Yes; the hypotenuse is 31 units
☐ B. No; they should add the squares: $c^2 = 49 + 576 = 625$, so $c = 25$ ☐ D. No; they forgot to multiply by 2

- 2) Triangles MNO and PQR are similar. If $MN = 6$, $NO = 8$, and $PQ = 9$, find QR .

- ☐ A. 10 ☐ C. 6.75
☐ B. 12 ☐ D. 9.5



3)

A scatter plot shows the relationship between advertising spending (in hundreds of dollars) and product sales (in units). The data points form a tight cluster around an imaginary upward line. What does this indicate?

- ☐ A. Weak positive correlation ☐ C. Weak negative correlation
☐ B. No correlation ☐ D. Strong positive correlation

- 4) In a study of 240 employees, 144 are full-time and 96 are part-time. Among full-time employees, 108 have health insurance. What is the relative frequency of uninsured full-time employees?

- ☐ A. $\frac{36}{240}$ ☐ C. $\frac{108}{240}$
☐ B. $\frac{36}{144}$ ☐ D. $\frac{108}{144}$



5) The probability of rain tomorrow is $\frac{2}{5}$. What is the probability that it will NOT rain?

☐ A. $\frac{3}{5}$

☐ C. $\frac{1}{5}$

☐ B. $\frac{5}{2}$

☐ D. $\frac{2}{5}$

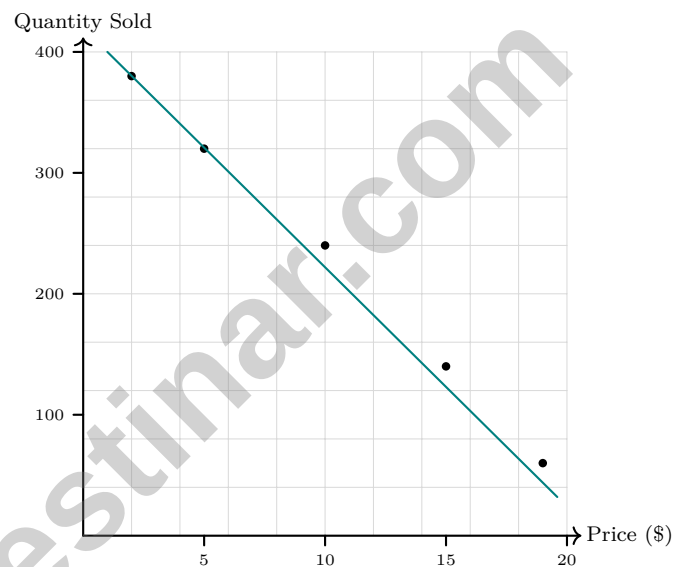
6) Five athletes compete in a race. In how many ways can they finish in 1st, 2nd, and 3rd place?

☐ A. $5^3 = 125$

☐ C. $5 \times 4 \times 3 = 60$

☐ B. $5! = 120$

☐ D. $\binom{5}{3} = 10$



7)

A store analyzes the relationship between item price and quantity sold. Which interpretation is correct?

☐ A. As price increases, quantity sold tends to decrease

☐ C. Price is not related to quantity sold

☐ B. Higher prices cause fewer items to sell

☐ D. Quantity sold determines the price


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- 1) A line has slope $\frac{3}{2}$ and y -intercept -1 . The inequality with this solid boundary and shading above is:

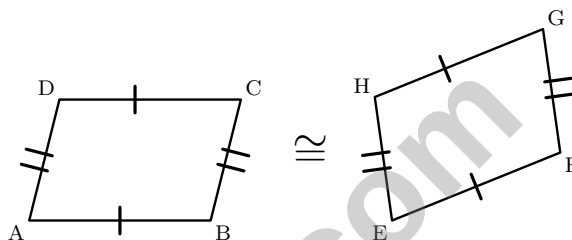
☐ A. $y > \frac{3}{2}x - 1$

☐ C. $y < \frac{3}{2}x - 1$

☐ B. $y \geq \frac{3}{2}x - 1$

☐ D. $y \leq \frac{3}{2}x - 1$

- 2) Two congruent quadrilaterals are shown. Quadrilateral ABCD corresponds to quadrilateral EFGH in order ($A \leftrightarrow E$, $B \leftrightarrow F$, $C \leftrightarrow G$, $D \leftrightarrow H$). Which statement must be true?



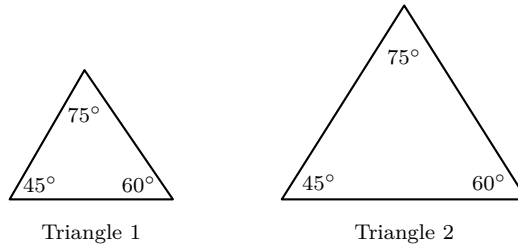
- ☐ A. Side AB is longer than side EF ☐ C. Side CD is shorter than side GH
☐ B. Angle A equals angle E ☐ D. The perimeters are different
- 3) A polygon has an interior angle sum of 1260° . How many sides does it have?
- ☐ A. 9 ☐ C. 7
☐ B. 8 ☐ D. 10

- 4) Solve the system $\begin{cases} 2x + y = 5 \\ x - y = 4 \end{cases}$ by elimination.



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& answers

- 5) Two triangles both have angles measuring 45° , 60° , and 75° . Are these triangles necessarily similar?



- ☐ A. No, the sides must also be proportional
☐ B. No, only two angles are given
☐ C. Yes, angles alone determine similarity (AAA)
☐ D. Only if the triangles are congruent
- 6) Which pair of points has a distance of exactly 10 units?
- ☐ A. (0, 0) and (6, 8)
☐ B. (1, 1) and (8, 8)
☐ C. (2, 3) and (3, 4)
☐ D. (0, 5) and (5, 0)
- 7) Data sets X and Y both have 4 values and mean = 20.
 Set X: {18, 20, 20, 22}
 Set Y: {10, 15, 25, 30}
 Without calculating, which likely has the larger MAD?
- ☐ A. Set X (more clustered)
☐ B. Set Y (more spread out)
☐ C. Exactly equal
☐ D. Cannot determine
- 8) What is the first difference for the sequence 5, 13, 21, 29?
- ☐ A. 8 (constant, so linear)
☐ B. 5 (not constant, so nonlinear)
☐ C. The differences vary, so nonlinear
☐ D. Cannot be determined without the x -values



Alaska AK STAR Grade 8 Practice Test Answer Keys**How to use this section with a Grade 8 student:**

1. check the answer first and circle any item that needs another look
2. retry the problem with fresh work before reading the explanation
3. write one short lesson learned from each missed or guessed item

A strong review routine turns every correction into a sharper plan for the next Alaska AK STAR practice test.

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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.EE.3) A positive exponent shifts the decimal to the right. Move the decimal 2 places right: $3.8 \times 10^2 = 380$.
- 2) **Choice D is correct.** (8.NS.2) A decimal that is non-terminating and non-repeating is irrational. The pattern of 0.303, 0.3003, 0.30003, ... never repeats, so this is irrational. $\frac{22}{7}$ is rational, and 0.999... repeats infinitely.
- 3) **The correct answer is 5.** (8.SP.2) The constant term is the y -intercept, so it is 5.
- 4) **Choice D is correct.** (8.NS.2) $(2.4)^2 = 5.76 < 6$, so $2.4 < \sqrt{6}$. Therefore $\sqrt{6}$ is greater than 2.4.
- 5) **Choice D is correct.** (8.NS.3) $\sqrt{36} = 6$ exactly (rational). All others are irrational because 17, 19, 21 are not perfect squares.
- 6) **Choice D is correct.** (8.G.9) After 3 years: $A = 2000 + 2000 \times 0.05 \times 3 = \$2,300$. Another 3 years of simple interest on \$2,000: $I = 2000 \times 0.05 \times 3 = \300 . Total: $\$2,300 + \$300 = \$2,600$. (Note: Simple interest, not compound, means the same principal earns the same amount each 3-year period.)
- 7) **Choice D is correct.** (8.EE.1) $5^0 = 1$; $n^7 \cdot n^{-7} = n^{7-7} = n^0 = 1$. Product: $1 \cdot 1 = 1$.
- 8) **Choice C is correct.** (8.EE.2) $14 \times 14 = 196$, so $\sqrt{196} = 14$.
- 9) **Choice D is correct.** (8.EE.4) Multiply coefficients: $8 \times 9 = 72 = 7.2 \times 10^1$. Add exponents: $10^{4+5} = 10^9$. Combine: $7.2 \times 10^1 \times 10^9 = 7.2 \times 10^{10}$.
- 10) **Choice C is correct.** (8.EE.5) Unit rate is slope: $\frac{3}{6} = \frac{1}{2}$. For every 1 unit of x , y increases by $\frac{1}{2}$.
- 11) **Choice B is correct.** (8.F.2) Slope of A: $(6-0)/(3-0) = 2$. Slope of B: $(7-1)/(2-0) = 3$. Since $3 > 2$, Line B increases faster.
- 12) **Choice A is correct.** (8.F.4) At constant speed with no initial distance, the slope is 60 mph and the intercept is 0. Equation: $d = 60h$.
- 13) **Choice A is correct.** (8.EE.8) Using any two points, e.g., $(0, -2)$ and $(2, 2)$: slope = $\frac{2 - (-2)}{2 - 0} = \frac{4}{2} = 2$.
- 14) **The correct answer is $\frac{1}{4}$.** (8.G.7) There are 13 spades in a standard deck. $P(\text{spade}) = \frac{13}{52} = \frac{1}{4}$.
- 15) **Choice C is correct.** (8.EE.7) Let $m =$ months. Provider A total cost: $60m$. Provider B total cost: $100 + 40m$. Setting them equal: $60m = 100 + 40m$, so $20m = 100$, giving $m = 5$ months.
- 16) **Choice C is correct.** (8.F.2) At $x = 0$, the point on the graph is at height $y = 4$. Therefore, $r(0) = 4$.
- 17) **Choice B is correct.** (8.G.9) $SA = 2(\frac{3}{2} \times 1 + \frac{3}{2} \times \frac{1}{2} + 1 \times \frac{1}{2}) = 2(\frac{3}{2} + \frac{3}{4} + \frac{1}{2}) = 2(\frac{11}{4}) = \frac{11}{2} \text{ ft}^2$.
- 18) **Choice A is correct.** (8.G.1) Apply the translation rule to the second point: $(-2, 4) \rightarrow (-2 + 5, 4 - 3) = (3, 1)$.
- 19) **Choice D is correct.** (8.EE.6) The y -intercept is the constant term b in $y = mx + b$, which is 4.
- 20) **Choice D is correct.** (8.EE.7) Add 2: $\frac{x}{4} = 5$. Multiply by 4: $x = 20$. Check: $\frac{20}{4} - 2 = 5 - 2 = 3$ ✓. (Distractor A: not multiplying by 4; C: arithmetic error; D: forgetting to add 2.)
- 21) **The correct answer is A, C.** (8.G.1) Correct: (A) All linear measurements (sides, perimeter) are multiplied by 2.5. (C) Area is multiplied by $(2.5)^2 = 6.25$. Incorrect: (B) Angles are congruent in dilation, not scaled. (D) Perimeter is multiplied, not divided, by 2.5. (E) Dilation preserves shape; polygon type does not change.
- 22) **Choice A is correct.** (8.EE.7) Multiply by $\frac{3}{2}$: $x \geq -6$.
- 23) **Choice D is correct.** (8.G.8) The line $x = -2$ is the boundary for any inequality involving x and -2 . For $\leq$ and $\geq$, the line is included; for $<$ and $>$, use a dashed line.
- 24) **Choice A is correct.** (8.F.1) The range is the set of all outputs (y -coordinates): $-1, 2, 5, 8$.
- 25) **Choice A is correct.** (8.G.9) From $V = \pi r^2 h$: $969.84 = 3.14 \times 49 \times h \Rightarrow h = \frac{969.84}{153.86} = 6.3 \text{ ft}$.
- 26) **Choice B is correct.** (8.SP.3) The line passes through $(0, 1)$ and $(6, 6)$. Slope = $\frac{6-1}{6-0} = \frac{5}{6}$.
- 27) **Choice C is correct.** (8.EE.8) The marked point where the two lines meet is $(2, -2)$, so that ordered pair is the solution.
- 28) **Choice C is correct.** (8.EE.7) GCF is 5: $5x^2 + 35x + 50 = 5(x^2 + 7x + 10) = 5(x+2)(x+5)$.



Hi, Calm Solver!

◇ This deep and steady book gave you six full Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. A calm mind can see choices more clearly. That matters in Grade 8, where one problem may have several possible entry points. ◇

★ **Remember this:** You practiced building calm by doing full tests. Each completed page is rehearsal for staying steady when the real test feels serious. ★

Calm-Test Moves

- **Pause:** Give your brain one quiet second.
- **Choose:** Pick the first useful step.
- **Continue:** Do not demand perfection immediately.
- **Check:** Use review time wisely.

Grade 8 test-day tip: If you feel rushed, slow your reading for one sentence. Clear reading saves time.

If you want to share something or ask a question, please email me at jay@testinar.com.

Jay Daie

Your Calm-Test Coach

PRACTICE TODAY. ACHIEVE TOMORROW.

6

Give your child the confidence and skills they need with **6 full-length Grade 8 Math** practice tests that reflect real test formats and cover all key math standards. Perfect for building skills, strengthening problem-solving abilities, and achieving success on test day!

WHAT'S INSIDE?



Standards-Aligned Practice

Questions designed to cover essential Grade 8 math standards.



Variety of Question Types

Multiple-choice, short answer, and more to build well-rounded skills.



Real-World Applications

Engaging problems that connect math to everyday life.



Step-by-Step Progress

Track improvement and build confidence with every test.



COVERS ALL ESSENTIAL TOPICS

- | | |
|---------------------------------------|----------------------------|
| ✓ The Number System | ✓ Statistics & Probability |
| ✓ Expressions & Equations | ✓ Pythagorean Theorem |
| ✓ Ratios & Proportional Relationships | ✓ Volume & Surface Area |
| ✓ Linear Equations | ✓ Transformations |
| ✓ Functions | ✓ Inequalities |
| ✓ Geometry | ✓ Data Analysis & Graphing |
| | ✓ And More! |



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